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Science play in the verbatim theatre: God and Newton's religious worldview in Craig Baxter's Play *Let Newton Be!* (2011)

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Abstract. The article is aimed at analyzing the representation of the image of Isaac Newton in the genre of the science play. The hermeneutic analysis contributes to the unfolding of the image in the transformative way; Isaac Newton tells the story of his life, success, and science interests through numerous sources, presenting himself not as a hero of science but as a man in the whole complexity of his controversial personality. The problem of selecting the sources and the use of artistic expressive means helps us better see the secret life of Newton and brings us back to the problem of a science play as a genre.

Keywords: Newton, science play, verbatim theatre, physico-theology, divine metaphysics, alchemy

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Научная пьеса в документальном театре: Бог и картина мира Ньютона в пьесе Крейга Бакстера «Да будет Ньютон!» (2011)

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Аннотация. Научная пьеса – жанр популярный и далеко не новый – оказывается одним из способов нового прочтения личности известного ученого. В нашей работе таким ученым является Исаак Ньютон с относительно недавними свидетельствами в пользу тайной, всепоглощающей страсти ученого к богословию и алхимии. Цель статьи – дать анализ репрезентации образа Ньютона-теолога и натурфилософа в документальной пьесе Крейга Бакстера «Да будет Ньютон!» (2011). Используя метод герменевтического анализа, мы прослеживаем документальный и исторический принцип реконструкции драматургом образа Ньютона на протяжении всей его жизни: «Исака», «Ньютона», «Сэра Исаака». Интертекстуальность соткана из цитат работ самого Ньютона, как опубликованных («Математических начал натуральной философии», вступительного эссе «Общей схолии», «Оптики»), так и неопубликованных (переписки с друзьями, многочисленных записей из тетрадей, дневников и гроссбуха), а также корреспонденции Лейбница и Кларка; отрывков из Библии, свидетельств и анекдотов друзей и биографов. Фактологическая основа является объектом адаптации, суть которой сосредоточить внимание на любви Ньютона к богословию; драматург опускает важные события в жизни Ньютона – службу хранителем и управляющим Монетного двора, возведение Ньютона в рыцарское достоинство королевой Анной, а приоритетный спор с Лейбницем переносит в теологическую плоскость. Диалоги с Галлеем и Лейбницем позволяют драматургу раскрыть картину мира Ньютона, неразрывно связанную с его религиозными мировоззрениями. Так, приезд Галлея открывает завесу экспериментальных опытов Ньютона в алхимии и исследовательской работе ученого в области физико-теологии. Спор Ньютона с Лейбницем раскрывает божественную метафизику Ньютона, когда Бог материально присутствует в каждой точке Вселенной, а пространство – не что иное, как «чувствилище Бога». Образ Ньютона-

богослова выстраивается драматургом с помощью экспрессивных средств, среди которых самым частотным является фигура повтора. Полученные результаты демонстрируют малоизвестную сторону личности Ньютона и дают возможность показать тесную взаимосвязь науки и религии в исторической перспективе. Более того, анализ пьесы возвращает современного зрителя и исследователя к вечному вопросу документального театра, научной пьесы и адаптации в широком смысле этого слова – границе документальной, фактической правды и свободы художника.

Ключевые слова: Ньютон, научная пьеса, документальный театр, физико-теология, божественная метафизика, алхимия

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Isaac Newton (1642–1727) is one of the most talented and well-known scientists in the world. Seen as a British national figure and the patron of English science, "virtually every survey of the public's choice for the most important persons of the second millennium includes the name Isaac Newton. A poll published in the 12th 1999 issue of the *London Sunday Time Magazine* ranked him first, even above Shakespeare, Leonardo da Vinci, Charles Darwin, and similar canonical stars" [1. P. 1].

Newton is largely known for his works in mathematics; however, his interests were not confined solely to mathematics. "He applied himself with unresting dedication to what may strike anyone today as a quite unmanageable range of concerns – optics, dynamics, history, astronomy, alchemy, chemistry, music theory, theology, and other subjects" [2. P. 1].

The science genius's public career also attracted much attention since his lifetime. "Not usually expected at first to live – he was later to remark that at his birth he was so small that he might have been put into a quart mug – he survived war, revolution, plague, to the age of 84, to be buried at the Westminster Abbey, idolized by his countrymen and admired by the world" [3. P. 2].

This "idolization" trend was largely formed by the memoirs of the family members, friends, and disciples who used to know Newton in person. Those were John Conduitt who married Newton's niece and lived in Newton's London residence for many years; Humphrey Newton who had served Sir Isaac as an amanuensis and lab assistant from 1685 until

1690; William Stukeley, a Royal Society Fellow; Bernard le Bovier de Fontenelle, a Royal Society Fellow and an author of the first post-mortem biography. Their memoirs were invaluable evidence for the most well-known and reputable biographies written in the hero-worship manner by two talented scientists – Sir David Brewster (published in the 1850s) and Louis Trenchard More (published in the 1930s) [4, 5].

It was not until 1936, the year when Newton's alchemical papers in possession of the family collection were sold at Sotheby's, that Newton gained the reputation of an alchemist and some years later a theologian. The theological writings became available to scholars only in the 1970s, when "it soon became clear that Newton had written major tracts on a wide range of theological topics at the same time as he was producing his major work in science" [6].

Needless to say that this mystic strain in his complex character contributed to the reinterpreting of the great man's personality in various genres. First of all, biographers tended either to show Newton as an alchemist and religious thinker or exaggerate the least attractive traits in his personality. If we look at the documentary biographies published in the 21st century, we come across "Newton the alchemist" [7] or revisit his personality in his "deviousness and vitriol"[1]) [8–12]. Some authors follow the astronomer John Flamsteed, who called Newton "SIN" (Sir Isaac Newton), and state their attitude to Newton's personality in the explicit way. Thus, "Isaac Newton: the asshole who reinvented the Universe" is the focus of the biography written by Florian Freisletter (2018) [13], while Nick Kollerstrom deals with "the dark side of Isaac Newton" (2019) [14].

The 21st century authors have frequently chosen Newton as a character or a protagonist of their works and the source of inspiration in their choice of genre. Book series with Newton as one of the leading characters were published by Gregory Keyes (the book series *The Age of Unreason* [15, 16]) and Neal Stephenson, the latter being inspired by "computing, codes, and gold" introduced in the three novels of the Baroque Cycle, *Quicksilver, The Confusion, The System of the World* [17]. After working on a biography about Newton, the "last sorcerer" [18], Michael White wrote a novel in the genre of a thriller, an occult mystery [19].

[1] This characteristic of Sir Isaac Newton can be found in Stephen Hawking's book *A Brief History of Time* [8. P. 181–182].

Playwrights also contribute to the dialogue about Newton, offering their own interpretations. While Alan Brody keeps in focus Newton as a man "in search of the God's design through science, alchemy, the Bible"[1], Carl Djerassi [1] makes a shift to the negative impact the abuse of power could make on other people within and beyond the Newton–Leibniz priority dispute.

One of the playwrights who was attracted by the personality of Isaac Newton is Craig Baxter, the author of 12 original plays, 6 stage adaptations, 3 radio plays, and numerous short commissions produced. He is currently teaching drama and creative writing at the University of Cambridge, Institute of Continuing Education.

The centre of this paper is the play by Craig Baxter *Let Newton Be!* (publ. 2011)[2],which seeks to find the connection of the alchemical pursuits of Newton and "real science" in the documentary context of letters, diaries, notebooks, ledgers, treatises, draft papers, and memoirs – a verbatim dramatic adaption of words written by and about Isaac Newton. Newton serves as an ideal personality for a documentary approach as he had left a great amount of papers that testify to self-education, search for Truth, and self-reflection as his key features.

The paper is aimed at showing the documentary features (constraints) and adaptation techniques (licenses) the playwright takes in the reconstruction of the inner world of Isaac Newton, obsessed with religion and alchemy. To do that, the paper seeks to answer two research questions:

(1) What image of Isaac Newton does the playwright create?

(2) How does the playwright do it?

Materials and methods

The primary source is a publication draft of the play *Let Newton Be!* by Craig Baxter. The documentary background of the play requires a scholar who is not a technical major to read closely the secondary sources, thus expanding their own and the reader's background knowledge.

[1] https://news.mit.edu/2016/3-questions-alan-brody-small-infinities-0407

[2] The author of the article thanks Craig Baxter for providing a copy of the play as the published variant of the play is not available in the Russian Federation. All the citations of the text are with the indication of page numbers in the parentheses. – *T.A.*

The interdisciplinary nature of verbatim theatre explains the use of the hermeneutic method, known as "the art of understanding particularly the written discourse of another person correctly" [20. P. 3]. Schleiermacher suggested that the historical principle of the work be understood with consideration of the "individuality of the author and work" that "must be seen in the context of larger facts of his life and in contrast to other lives and works" [20. P. 107]. The distinction between the purely psychological and technical is "in terms of the first being more concerned with the emergence of thoughts from the totality of life moments of the individual" [20. P. 104], while the second with determining the sequence they develop in the work of art. In line with Hans-Georg Gadamer, interpretation is seen as a re-creation "of the created work, which has to be brought to representation in accord with the meaning the interpreter finds in it" [21. P. 111]. Having a global and local perspective, the paper uses the history-cultural, aesthetic, and speculative aspects of the text interpretation.

The hermeneutic analysis of the play is performed in the chronological, scene-by-scene order. There are three major sections that correlate with three periods of Newton's life and three characters of the play: "Isack, the sober, silent, thinking lad", "Newton, the last sorcerer", "Sir Isaac, the priest of nature". Based on close reading, the hermeneutic analysis allows identifying two major semantic centres of the play: the arrival of Halley and the alchemical pursuits in the laboratory and the conceptual dispute with Leibniz on the divine metaphysics. In each case the seminal works by Newton were taken as the evidence for the argumentation: *Principia Mathematica* and *General Scholium.*

By showing Newton's sustained interest in religion and alchemy throughout all his lifetime, the playwright underscores the important role of these subjects for Newton, the scientist and the man. As the mid-years are the most prolific period of Newton, I have thought it logical enough to weave two sections that contextualize Newton's interconnection of science and theology with a special section devoted to understanding the role alchemy played in the historical context of early modern Britain and in the life of Newton.

Isack–Newton–Sir Isaac: Intertemporal, interdisciplinary, intertextual hermeneutic analysis

There are three characters in the play that represent the different age of Newton as well as "different aspects of the great man's personality": "Isack,

the boy; Newton, the isolated genius; and Sir Isaac, the autocrat of British science" [22. P. 1]. Putting Isack–Newton–Sir Isaac in the position of a character, narrator, observer, and interlocutor allowed the playwright to provide the major factual information and trace the evolution of his personality through the outer focus (key events) and inner focus (writing style).

The play has 13 scenes, each of them depicting a certain period in Newton's life. Both the exposition scene (*Scene 1. Overture*) as well as the final scene (*Scene 13. Beside the Fire (1727)*) introduce and echo the "three-body problem", which Newton tried to solve throughout his whole life. In Scene 1, Newton's words from his Book 1 of *Principia*, 1687, are read by all three characters, each field of science correlating with a certain period of life:

> *Isack*: If
> *Newton*: three
> *Sir Isaac*: bodies
> *Newton*: whose bodies decrease in a duplicate ratio of the distances,
> *Isack*: attract each other mutually,
> *Newton*: And the accelerative attractions of any towards the third be between themselves reciprocally as the squares of the distances;
> *Sir Isaac*: And the two least revolve around the greatest (2)

Suffering from severe pain in the attempts to pass a kidney stone, Isack–Newton–Sir Isaac pronounces the most important fields of knowledge Newton would struggle with throughout all his life. The playwright gives the name of the field of science to each character that correlates with this or that period of Newton's life:

> *Isack*: Light
> *Newton*: Motion
> *Sir Isaac*: Prophecy
> *Newton*: Chemistry
> *Sir Isaac*: History
> *Isack*: Time (4).

The remainder of the paper shows how these fields resonate in each of the periods of Newton's life.

1. Isack: The "sober, silent, thinking lad"

The section traces major events in the academic, scientific, and spiritual life of the great man: the birth and Isack's early years at Lincolnshire

(1642) in Scene 3; Isack's study at Cambridge University, his interest in natural philosophy, first attempts of self-reflection and analysis of "sins committed" in Scene 4; Isack's experiments with light and researching the phenomenon of light and colours in Scene 5; Isack's election as Trinity College Fellow (1667) in Scene 6. This first period of Isack's lifetime is marked by the failure to meet the expectations of relatives and acquaintances along with the trend to introspection and analysis. He was not fit for grazing, following the plough or driving sheep to markets or fairs. Instead, he "spends most of his time when out of school in making knick-knacks and models of wood in several kinds" (9). From his grammar school education, he remembers phrases from the Latin exercise book:

> *Sir Isaac/Woman*: A little fellow.
> *Isack:* No man understands me.
> *Newton/Woman*: There is no room.
> *Sir Isaac/Woman*: I cannot but weep.
> *Newton/Woman*: I cannot but weep.
> *Isack*: I cannot but weep. (9)

The woman's verdict is unfavourable:

> *Sir Isaac/Woman*: Fit for nothing but the 'Versity. (11)

At Trinity College Isack was as lonely as at Woolsthorpe. Isack was a subsizar and being tight with money he served the wealthier students doing different jobs – cleaning boots, waiting at table, emptying chamber-pots. While he did commit sins while playing cards and losing 15 shillings, he was self-disciplined so that to write all his expenses in the ledger. Most importantly, he started reading intensively and soon [he] "always informed [himself] beforehand of the books [his] tutor intended to read, and when he came to the lectures found that he knew more than the tutor" (15). In his mathematical notebook Newton would write about inventing the method of approximating series and the direct method of fluxions and confessed that then he was "in the prime of his age for invention and minded mathematics and philosophy more than at any time since" (16). One of the experiments in his student years was the one with light. He found Descartes's and Mr. Hooke's hypotheses to be erroneous: light is not "homogeneal" as it was considered but consists of waves.

In 1664 Newton wrote 45 unresolved problems in nature and human life in his *Questiones quaedam philosophicae.* The problems are rooted in God and his nature in his "omnipresence" and resonate throughout all Newton's life:

Isack: Does it not appear from these phenomena that there is a being. Incorporeal, living.
Newton: Intelligent,
Sir Isaac: Omnipresent, who
Newton: …in infinite space…
Sir Isaac: …as it were and is sensory…
Newton: sees…
Isaac: and feels
Newton: himself…
Isack: intimately…
Newton: …and thoroughly…
Sir Isaac: perceives them and comprehends them…
Newton: Wholly…
Isack: Wholly…
Sir Isaac: Wholly.
Newton: We cannot clearly distinguish how far an act of sensation proceeds from the soul and how far from the body. (20)

In 1667 Isack was elected a Fellow of Trinity College and in 1669 the Lucasian Chair of Mathematics. These events, being a great step forward in Newton's career, had a catch. Isack had to swear of an oath "he didn't fully believe", and the words of the oath "to embrace the true religion of Christ" and promise to take the Holy Orders or resign from College are muted by Newton's calculations of expenses written down in his ledger:

ISACK in chapel	*NEWTON at the ledger*
Isack: I promise that I will set the authority of Holy Scripture before the judgments of men, and that I will take the rule of my life and the highest of my beliefs from the word of God.	**NEWTON:** Iron work for it: 9 shillings Drills, gravers, a hone and hammer and a mandrill: 5 shillings Two pair of shoes: 8 shillings Two pair of gloves: 5 shillings A bible binding: 3 shillings (21)

The early years paved the way for Newton's own science, which is closely connected with theology and physics, as we can say today – interdisciplinary.

2. Newton: The "last sorcerer" [18]

The "good fellow" Isack became a "bad lecturer" Newton. In Scene 7, Professor Newton is muttering the words of his optics lecture to his only student Isack. Being obviously bored and uninterested, Isack is holding the Bible and pronounces "what has been long called Arianism is no other than Old uncorrupt Christianity" (24). At the end of the lecture Professor Newton "talks over Isack to drown him out" just as in the previous scene Newton's voice is trying to drown out Isack's words of oath.

Newton was not expelled from Cambridge for his "Arian heresy" as his student Isack had expected. In 1675 Newton received a dispensation from King Charles the Second to "continue fellow at Trinity without taking holy orders"[1].

Scene 8 shows us Newton as a Fellow of the Royal Society at the meeting in 1675. He is "unsure of himself and how to behave"; he has come with his invention, a reflecting telescope, which was met with great enthusiasm. On the one hand, he is interested in the "duties he is subject to" while being a Fellow of the Royal Society. On the other hand, he states that he "wishes to be put out from being any longer fellow of Royal Society" since he "shall neither profit time, nor (by reason of the distance [between Cambridge and London] can partake of the advantage of their assemblies" (27). On top of that, unexpectedly for many other fellows and counterintuitively, he is "no longer solicitous about matters of philosophy" (28).

He is about to leave with his telescope when Sir Isaac/President informs him of the decision that Newton "be dispensed with his quarterly payments to the Society as several other [esteemed members] are" (28). Newton, who is "outmaneuvered", reluctantly leaves the telescope "at the clutches of the Royal Society experts" (28).

Scene 9 unveils Newton's views on religion as well as alchemy which is also deeply rooted in religion. The activities of this period are shrouded in mystery as well as the whole lonely decade of the great man's life; for this reason this scene is the centre of the play. The importance of alchemy and religion for scientific pursuits require additional attention paid to these disciplines to be addressed in this paper.

[1] John Conduitt. Fair Copy of the Memoir of Newton. Published at: https://www.newtonproject.ox.ac.uk/view/texts/normalized/THEM00145

2.1. Newton's science and theology in the 17th century context

One of the key questions for dispute among scholars is how Newton's theological interests are interacted with his advancements in natural philosophy or science. There are disagreements in what way Newton's "divine discourse" is related to alchemy. Betty Dobbs considers Newton's Arianism to be the alchemical vegetative spirit responsible for non-mechanical action such as fermentation and gravity [23]. In contrast, Rob Iliffe argues for the disciplinary division of theology and alchemy, providing evidence of the lack of theological themes in any alchemical paper [24]. In line with Paul Greenham, I claim that "Newton's chymistry affords a specific insight into the manner in which Newton's understanding of God – and his interpretation of Scripture – intersected with his natural philosophy" [25. P. 193]. I also use the term "physico-theology", which is traditionally seen as the argument for God's existence. Physico-theological discourse is present in and interconnected with alchemy. On the other hand, divine metaphysics is seen as the sensorium of God and God's role in the generation of motion.

2.2. Alchemy and Newton's physico-theology

Alchemy is known as a philosophical, spiritual, as well as a physical discipline, having deep roots in the ancient traditions developed in Egypt, India, China, Arabic World, Europe (Hellenistic alchemy, Latin alchemy). Since ancient times, the ultimate goal was to find the Philosopher's Stone, a substance that could connect any base metal to gold. Along with this utilitarian goal, the aim was to reach spiritual insight (the inner meaning of alchemical work as a spiritual path), knowledge of philosophy (the constituents of the universe, the origin of life), and the experimental findings in the exact sciences (medicine, chemistry, and metallurgy).

Newton was not as much interested in gold and getting rich in that way as he was seeking answers to religious and philosophical questions. His aim was to reach transmutation of base metals with the help of antimony. While his efforts to understand and control the elements were supported by experiments, the ancient tradition that appealed to Christians equated the death and resurrection of Jesus Christ as a transformative process that was echoed in certain physical matter was largely a philosophical one. In order to get the necessary knowledge, Newton relied on sources as well as his own experiments.

Newton got interested in alchemy in his student years. By the end of his life, in his own collection he had 169 books on alchemy, 16% out of 1620 were books on mathematics, physics, and astronomy, whereas theology and alchemy comprised 32% of the books, history and chronology 14%. Richard Westfall estimated the alchemical heritage of Newton as 1,200,000 words [11].

Newton selected the material to be studied; he read in Latin, learnt Hebrew and copied the material in the books. He had read Greek alchemists, Arabic alchemists, the alchemists of the medieval Latin West, of the Renaissance, and of his own period. He had read Aristotelian alchemy, medical alchemy, Neoplatonic alchemy, and mechanical alchemy. Reading extensively, Newton also used "intensive" technique. Betty Dobbs defines "intensive" and "extensive" practices of reading, intensive reading being related to "decoding the obscure descriptions of writers such as Philalethes, Sir George Ripley, and Nicholas Flamel - descriptions like "the green lion", "the doves of Diana", and "Jove's eagle" [3. P. 156]. According to White, "hundreds of alchemists wrote books about the techniques they used but deliberately obscured their meaning with codes or poetic language so that other chemists could not copy them" [19. P. 384]. One more reason was just their desire to hide their own failure; today we know that transmutation is possible in nuclear reactions in the process known as nuclear fission.

Extensive reading was aimed at producing his compilation of a series of lexicons or dictionaries. Such was the *Chemical Dictionary* of the late 1660s, or, more importantly, three successive versions of *Index chemicus*, drafted between the early 1680s and the early 1690s. Thus, Newton's heritage can be of four types: exact transcripts of other works; translations of other writings; summaries, indexes, comparisons; Newton's own contributions [26]. One of Newton's working habits was to reflect or emulate the language of the original in his summaries and anthologies, "where he frequently flips from English to Latin or from Latin to English as he changed from one author to another without a break in the text or any noticeable change in handwriting" [3. P. 24].

While reading the works of other alchemists, Newton tried to learn; he also learnt a lot while conducting his own experiments. From our modern perspective, his experiments were quite basic.

To understand the process, we summarize a remarkably clear description made by Michael White. At the initial stage alchemists mixed in a mortar three substances: a metal ore, usually impure iron, another metal (often lead or mercury), and an acid of organic origin –most typically citric acid from fruit or vegetables. They grounded these together for anything up to six months to ensure complete mixing, and the blend was then heated carefully in a crucible. The temperature was allowed to rise very slowly until it reached an optimum, which was maintained for ten days. This was a dangerous process that produced toxic fumes, and many alchemists working in cramped, unventilated rooms succumbed to poisoning from mercury vapour. Others went slowly mad from lead or mercury poisoning.

After the heating process was completed, the material in the crucible was removed and dissolved in an acid. Many generations of alchemists worked with different types of solvent, and in this way nitric, sulphuric, and ethanoic acid was discovered.

After the material had been successfully dissolved in the solvent, the next step was to evaporate and reconstitute the material – to distil it. This distillation process was the most delicate and time-consuming step… It was also another dangerous stage – the lab fire was never allowed to go out, and there were frequent accidents.

If the experimenter was not consumed by flame, and the material was not lost through poor experimentation techniques, then alchemists could move on to the next stage, a step most clearly linked with mysticism. Combined with sulphur from metal ore and carbon from the organic acid, alchemists then had, quite literally, an explosive mixture – gunpowder. Alchemists who survived poisoning and fire ended their days going up with the lab in detonation.

The final stage was the mixture sealed in a special container and warmed carefully. Then, after cooling the material, a white solid was sometimes observed, which was known as the White Stone, capable of transmuting base metals into silver [19].

As alchemy was punishable by death during his lifetime, Newton worked either alone or with his disciple Humphrey Newton and coded many of his notes. When his papers were decoded by Keynes, the significance of the Revelation and The Book of Daniel became obvious, as “he regarded the universe as a cryptogram set by the God Almighty” [26. P. 314], and finally “he did read the riddle of the heavens” [26. P. 322].

2.3. Scene 9: The semantic centre of the play

The scene opens with the introductory words of Genesis that provide an account of the creation of the world. Here the playwright uses the extract from *Treatise on Revelation* (Section 2) which has a paraphrase in italics and a direct quote, just in the way Newton worked:

> *Newton:* He that overcometh, says he, and keepeth my work unto the end to him will I give power over the Nations and he shall rule them with a rod of …
> *Isack: (placing iron filings in a crucible)* Iron
> *Newton*: As the…
> *Isack*: *(placing the crucible in the furnace)*… vessels of a potter…
> *Newton:* Shall they be broken to shivers. (30)

Following the divine discourse, Newton's Commentarium referred to the "Emerald Tablet" written by Hermes Trismegistus, the founder of the spiritual strand of alchemy called Hermeticism after his name:

> *Isack*: Just as the world was created from dark chaos through the bringing forth of the light and through the separation of the airy firmament and of the waters from the earth, so our work brings forth the beginning out of black chaos and its first matter through the separation of the elements and the illumination of the matter. (30)

Interestingly enough, the voice of Newton is heard simultaneously in dialogue with Isack; he is reciting the first words from Genesis, Chapter 1:

> *Newton*: In the beginning God created the heaven and the earth. And the earth was without form and void; and darkness was upon the face of the deep. (30)

"Newton saw direct hand of God in the creation and continued operation of the cosmos, and "God's unlimited power" [27. P. 214], and this power caused cosmos to be animate:

> *Newton*: Thus may the whole heavens, or any part thereof whatever, be the habitation of the Blessed… And subject to their dominion. (30)

As we move our bodies, so God can move objects in the world. Chemical and alchemical reactions are also analogous to the organic process. Three kingdoms of nature – animal, vegetable, and mineral – obey

the rules of God; Newton noted that the "vegetable spirit" causes metals to grow, putrefy, and regenerate within the Earth. Having said that, Newton contributed to the long-lasting debate of the purely mechanist understanding of nature provoked by dualisms of both the Cartesian and Cambridge Platonist varieties. Here Isack recollects the vegetable and mechanical actions elaborated in his early treatise *On Natures obvios laws and processes in vegetation* (1672):

> *Isack*: Nature's actions are either
> *Isack and Newton*: vegetable
> *Isack*: or purely…
> *Isack and Newton*: mechanical. (30–31)

One of the mechanical actions of nature is inertia. Newton solved the problem of the planetary orbits in terms of inertia and gravity. When Edmond Halley came to see Newton in his solitary laboratory, he tried to talk about the centripetal force, such as gravity. Newton was obviously irritated to be digressed from his "real business". This business was church history and attempts to corrupt it. Newton believed that reading the Scriptures literally would provide understanding of the chemical processes. Isack (Newton's laboratory assistant) and Newton talked seemingly about different things, but in its essence, it is one.

> *Isack:* And with a gentle heat… the rod of Mercury reconciles the two serpents and makes them stick to it.
> *Newton now puts pen to paper…*
> *Newton*: The year 381 is, without controversy, that in which this… whole fornication…
> *Isack places the crucible into the furnace.* (32)

The magic strand Newton pertains to is religious one; however, Isack's words, though about experimental philosophy, are also hard to understand without a commentary.

In alchemy the planets are connected with metals, classic metal elements**:** Mars with iron, Venus with copper, Jupiter with pewter, Mercury with mercury, Saturn with lead, the Moon with silver, the Sun with gold, Terra, the Earth with antimony. According to the mercury-sulphur theory, transmutation of mercury atoms into gold atoms is a perfect way to find the

Philosophical Stone. There are two ways to achieve it: mercury extracted the wet way, the noblest one, when the liquid composes the matter's solvent – also known as the secret fire; and mercury extracted the dry way, with the help of heat, in the furnace.

Newton was keeping notes of all types of experiments, using his own language and symbols as soon as he considered his alchemical pursuits to be for the few.

The play shows the examples of this metaphorical language:

> *Isack*: … putting the mother in the belly of her infant…[1] (32)

Encoding his recipes with mythological symbols to protect their hard-won knowledge, Isack describes his chemical procedure:

> *Isack*: *(Contemplating his crucible in the furnace)* Our Pluto, the God of wealth or Saturn who beholds himself in the looking glass.
> *Isack*: Chaos.
> *Isack:* … that is the hollow oak… the blood of the Green Lyon. (32–33)

The "hollow oak" symbolises the "furnace in which dissolution occurs", one of the six essential things an alchemist should know, according to a daybook "Ephemerides" (1634–1660). The "greene lyon" is raw antimony ore that draws in vivifying celestial influences symbolized by the sun and emits a vivified mercury, the living or "actuated" character of which is symbolized by blood". "The Hunting of the Greene Lyone" is also a poem written by the Vicar of Malden in Ashmole that was found in Newton's library.

Going back to the event outline of Scene 9, Halley who was left to himself finally managed to ask Newton a question about the "curve described by the planets, supposing the force of attraction towards the Sun to be reciprocal to the square distance of it" – it was ellipsis. If Halley had not visited Cambridge in 1684, would the *Principia* have been written? Thanks to him and his support the Book of Principles – *Philosophiae*

[1] Newton uses the quotation from *The Secret Book of Artephius*: "<T>he mother must be put into and sealed within the belly of her infant, and that is sol himself, who proceeded from her, and whom she brought forth". https://archive.org/stream/man-the-grand-symbol-of-the-mysteries-manly-p-hall/Liber%20Secretus%20-%20Artephius_djvu.txt

Naturalis Principia Mathematica – was written in "about 17 or 18 months". In April 1686 Newton sent the first part of his Latin manuscript to the Royal Society for publication. It was published with the Ode to Newton penned by Halley in the preface to the first volume. In April 1687 Halley received the complete work.

2.4. Scene 10: Events vs. introspection

Scene 10 is full of important events in the life of Newton; the most important ones being elected a member of Parliament for Cambridge University, accepting the position of the Warden of the Mint in early 1696 and becoming Master of the Mint in 1699. In 1701 he resigned the Fellowship at Trinity College and the Lucasian Professorship. In 1703 he was elected President of the Royal Society.

The important events are only enlisted; however, the mental breakdown that Newton is experiencing is shown with the help of the phrases from his grammar exercise book:

> *Newton*: My poor help. He is pale. There is no room for me to sit. What employment is he fit for? What is he good for? No man understands me. You are sure to be punished. He should have been punished. I will make an end. I cannot but weep. I know not what to do. (37)

In the capacity of an elected Member of Parliament Newton pronounces just one phrase:

> *Sir Isaac*: *(starting strong but pathetically weak by the end of the speech)* I propose a motion that that window be closed. There is a draught. In here. Do you not think? (40)

The factual background of the play is seen to be secondary in favour of the introspective nature of the scientist.

3. Sir Isaac: The "priest of nature" [28. P. 28]

Scene 11 as a whole is a meeting at the Royal Society with Sir Isaac as President, Newton a member and Isack Secretary of the Royal Society. The meeting does not have much action, rather it is the expressing of Newton's

world view with the help of the divine metaphysics discourse. The whole scene is the reciting of the words of the *General Scholium*. *General Scholium* to Isaac Newton's *Principia Mathematica* is an appendix to the 2nd edition (1713), which reappeared in the 1726 edition of *Principia. General Scholium*, the best known and the least understood Newton's work, is a "powerful manifesto of his goals in natural philosophy and theology"[1] along with his commitment to a dual reformation in these two spheres, which Newton believed were thoroughly bound together. Along with countering the natural philosophy of Leibniz and the Cartesians, Newton elaborated on the design argument of the "dominion of an intelligent and powerful Being, Lord God Pantokrator"(42), as well as an implicit attack on the doctrine of Trinity, which Newton saw as a post-biblical corruption.

The religious dispute continues in Scene 12, this time between Isaac Newton (Sir Isaac, a lecturer in London lecture room) and Leibniz (Newton). There is a question from the audience:

> *Newton/Leibniz*: *(from the audience)* [Would Mr Newton agree with me that] Natural Religion itself, seems to decay [in England] very much? (44)

Pretending not to hear, Sir Isaac states that "[A Royal Society Committee found your differential] method one and the same with [my] method of fluxions excepting the name and mode of notation [and reckoned Sir Isaac Newton] *(clearly indicating himself though speaking in the third person)* the first inventor [by] fifteen years" (44). Leibniz, however, insists, "I am not present here to ask about mathematics" (44), and "very deliberately changes the topic back to religion".

The phrase that so outrages Newton was met in the letter Leibniz sent to Samuel Clarke (1675–1729), an English philosopher and Anglican cleric:

> *Newton/Leibniz*: In natural religion… in England [you] will have human souls to be material… [And] hold… that God himself to be a corporeal being. (44)

Sir Isaac immediately reacts to the "coup" Leibniz is staging; the essence of it is a different worldview. According to Leibniz, God is a "mind that created the world in accordance with mathematical laws" [29. P. 43].

[1] https://isaacnewton.ca/newtons-general-scholium/

God is a non-corporeal and super-naturalistic entity; corporeal phenomena cannot be explained without a non-corporeal origin, i.e. God. The supernatural exists only in the moment of divine creation; after that the world develops according to its laws. Science reveals precisely those laws of motion that God created. A human being should be aware of the ultimate causes or functions in the world: the function of the natural and social creation of the world, the function of structural and mathematical arrangement of the world, the source of power and might, the function of the prime mover of motion.

By contrast, Newton opposes Leibniz's method of "ultimate causes". His method relies on the active role of a natural philosopher whose experiments form a basis for inductively establishing the basic laws of science and their corresponding laws. Newton's world system is a great mechanism with the laws that can be discovered by the researcher by induction through observation and experiment. Unlike the scholastic vision of God,

> *Isack*: [God is present in the world] as a Governor; acting upon all things, himself acted upon by nothing… He is not far from every one of us, for in him we (and all things) live and move and have our beings… God does not exist *in* space, and *in* time; but His existence *causes* space and time. (47)

Defending the inductive method of inquiry, Newton opposes the scholastic method of ultimate causes and asks Leibniz the question which he could not answer.

> *Sir Isaac*: Philosophers… may search after and discover the cause if they can; be it mechanical or not mechanical. But if they cannot discover the cause, is therefore the phenomenon, or matter of fact, discovered by experience ever the less true? (47)

Leibniz could not answer the question because "Newton/Leibniz collapses and is still" (48).

Scene 13 is the final scene that returns the audience to the beginning: the "three bodies problem", which unites all three characters – Isack, Newton, Sir Isaac.

In the end each of the characters that represents Isack Newton as a whole entity utters the words that can characterise the inner self of each of them in one. Sir Isaac underscores the idea of God's "everywhereness":

"the famous association of absolute space with the sensorium of God can be understood as presenting the epistemological and volitional correlates of the metaphysical doctrine that space and time are generic attributes of God" [30. P. 312].

> *Sir Isaac*: Space is eternal in its duration and unchangeable in its nature, because it emanates from an eternal and immutable being… [who] created space along with creating his ubiquity, his own everywhereness… You are conscious that you can move your body at will… by thought alone… So we can't deny that God also has this power to move bodies by thought given that his faculty of thought is infinitely greater and faster than ours. And by parity of argument, we have to agree that God can, purely by thinking and willing, prevent a body from entering this or that region of … space. (50)

Newton is associated with his observations and experiments in optics:

> *Newton:* I can still conjure up an image of the Sun if I put my mind to it. (50)

Isack as secretary of the Royal Society is the last to inform that Sir Isaac was dead:

> *Isack/Secretary*: Minutes of the Royal Society March 23rd 1727. The Chair being vacant by the death of Sir Isaac Newton there was no meeting this day. (51)

Discussion: Expressive means of creating the image of Newton

This section seeks to answer the question of the expressive means Craig Baxter uses to reconstruct the image of Newton. Working in the genre of a biographical documentary, the playwright builds the composition on the documentary sources. They surely help the audience better see Newton objectively, without any evaluation or critical stance. Reflected by his own writings, Newton is seen as a doubting, lonely, constantly Truth- seeking personality. The playwright uses repetition as a frequent expressive device.

The oldest three-body problem is a constant troubling thought Newton is struggling with throughout his whole life (Scene 1 and Scene 13). The three-body problem that is in the first and the last scenes in the play indicates his long-lasting interest as it ties together the motions of systems of three bodies (like the Sun, Earth, and the Moon), and how their orbits change and evolve due to their mutual gravity. This problem also serves as

a mystic strain of number "three" in his life: Trinity College, Anti-Trinitarianism, which is emphasized by a symbolic number of three Newtons in the play.

Newton as a man, his vulnerable and lonely nature, is seen in his constant repetitions of the lines from the Latin grammar textbook, repeated by all three characters thorough time and space.

> *Sir Isaac/Woman:* I cannot but weep.
> *Newton/Woman*: I cannot but weep.
> *Isack*: I cannot but weep. (9)

Interestingly enough, the same words from his Latin textbook come into the mind of the middle-aged Newton who is at the stage of his mental breakdown:

> *Newton:* My poor help. He is pale. There is no room for me to sit. What employment is he fit? What is he good for? No man understands me. You are sure to be punished. He should have been punished. I will make an end. I cannot but weep. I know not what to do. (37).

There is also one more repetition that has a symbolic, metaphorical meaning: a pebble. The word "pebble" is used six times in the play as a material artefact in different contexts. In Scene 2, the dying Sir Isaac is attempting to pass a kidney stone. In the long run Sir Isaac "emits the almightiest cry yet followed by a momentary silence, followed by the sound of a pebble dropping into the tin pail between his feet" (8). A pebble is also an object of scrutiny for a "little fellow" Isack:

> Isack reaches into the pail, removes the pebble and studies it intently. (8).

The pebble is also a "result of [Newton's] alchemy" (34) and an object of the analysis.

Finally, the pebble is the last object Isack/Newton/Sir Isaac sees before he is dead: "Isack notices his pebble lying on the floor. He goes over and picks it up, turns it over in his hand… Isack places his pebble back to the ground" (50).

The pebble serves as a reminder of Newton's reflective writing: "I don't know what I may seem to the world", Newton said before he died, "but as to myself, I seem to have been only like a boy playing on the sea-shore and

diverting myself in now and then finding a smooth pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me".

Though the play ends with Newton's death, it is about the hero's immortality. It is quite logical that the title of the play (*Let Newton Be!)* is two lines by Alexander Pope meant to be an epitaph to Isack Newton's tomb at Westminster Abbey:

> Nature, and Nature's Laws lay hid in Night,
> God said," Let Newton be!" And All was Light.

Finally found its proper place at Woolsthorpe, the poem is a great summary of both Newton's personality and path in science and Craig Baxter's play.

Conclusion

> Religion without science is blind.
> Science without religion is lame.
> *Albert Einstein*

A science play often shows a great or well-known scientist in the decisive moment of his life. In this respect a science play meets the goal of science popularisation with its goal to educate and entertain the audience. The documentary nature and factual precision of the verbatim theatre helps Craig Baxter address Newton as a personality with few events and lots of dialogues happening before the eyes of the audience. Selecting both published and unpublished works by Newton broadens the scope of the biographical science play, starting the dialogue between texts, historical periods, nations, and disciplines. The complex hermeneutic analysis helps us better see all the connections which make up the texture of the play.

What is the image of Newton we can get from the play? Newton is a highly committed to what he is doing and continuously seeking his own path to the Truth, be that a three-body problem or the decoding of the Scriptures, seen as the answer to many questions of the Universe. Being with "one foot in the Middle Ages and one foot treading a path for modern science" [26. P. 319], Newton could work out his working habits and his recipe of the scientific inductive method, the one based on the experiment with the combination of hard self-work and observation of laboratory experimental data.

The role of self-study, based on the "unusual powers of continuous concentrated introspection" [26. P. 312], is emphasised by only three characters (Isack–Newton–Sir Isaac) in constant dialogue with each other. The other people – Halley and Lebniz – serve as the background to express Newton's own views on what he considered the most important – physico-theology and divine metaphysics. Newton's unique introspection has a downside, his loneliness. A verbatim play allows Newton and his contemporaries speak themselves, without any interpreter, thus making the individuality of the character more humane and communication between him and the audience more intimate.

The repetition of a three-body problem, lines from the Latin grammar textbook, the word "pebble" as a metaphor resonate in the play and are signs of his own fate.

Appreciating the range and depth of Newton's accomplishments and his complex personality, the poem by Alexander Pope does serve as an epitaph in the context of "theatre of ideas – at its very finest – mesmerizing, inventive, and provocative" [31. P. 937].

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